Philosophy 370
Moral Issues in Engineering (Engineering Ethics)

Autumn Semester, 2009 Dr. Vivian Weil

Course Syllabus

Please read this syllabus carefully and keep it in a binder so you can refer to it. The syllabus is designed to answer virtually any question you may have about the course.

Goals:

1) Learn to identify ethical aspects of engineering problems, e.g. "We could substitute a cheaper, almost equivalent composite for material currently used in the fuel pump. Should we tell the customer?" Ethical issue: deception.
2) Acquire skills for preventing or dealing with ethics problems: noticing early signs, reasoning to identify ethically defensible options to resolve problems in the actual circumstances in which they occur, and implementing options.
3) Develop moral imagination so as to enter into the outlooks of others, not only engineers, and visualize consequences of possible options.
4) Learn to tolerate and also to reduce disagreement and ambiguity.
5) Master intellectually challenging key concepts: moral agency, responsibility, profession/professional standards, duty/obligation, right, wrong, reasonable care, permissible, defensible, justifiable, occupational role, loyalty, conflict of interest, cost/benefit analysis, confidentiality, utilitarian and respect for persons thinking.

What the course covers:

- Engineering as a profession: a) a brief history; b) the workplace **and** the wider set of social institutions in which engineering is situated; c) ethical standards of the profession, the codes of ethics.
- Professional ethics **as distinct from** law, common morality, and the market.
- Responsibility: a) role; b) causal; c) liability; d) capacity; e) forward-looking
- The standard of reasonable care
- Loyalty: critical and uncritical
- Professional dissent, disobedience, and whistleblowing.
- Honesty, sharing and withholding information, confidentiality, secrecy
- The engineer's perspective alongside the business manager's perspective.
- Conflict of interest, bribery, extortion, grease, gifts
- Managing risk to humans and the **environment**
- Aspirational Ethics: above and beyond expectations
- Engineering in the global context

Method:

1) Reading, listening to, and **critiquing** what practicing engineers, engineering professors, philosophers, and other thoughtful persons have to say about the topics listed above.
2) analyzing cases -- realistic "hypotheticals" and studies of actual occurrences such as the Shuttle disasters-- to a) identify ethical issues, b) construct options for resolving problems, c) evaluate options, with an eye to what's feasible, as well as ethical.

3) discussing readings and cases in class to evaluate arguments, learn concepts, test ideas, and become comfortable with ethical give-and-take.
4) making presentations and completing writing assignments and exams that **require taking a position and defending it with reasons**. Every class will feature discussion of a case. Many classes will include a writing exercise of one minute, two sentences (not graded) that focuses on a major point of that day's class.

Text: ***Engineering Ethics: Concepts and Cases*** by Charles Harris, Michael Pritchard, and Michael Rabins (4th Edition!). Some **additional required** readings will be placed in Blackboard or found online. These additional required readings are indicated in bold in the class schedule. Your binder will be useful for printouts of all your additional readings.

Course Assignments:

1. A typed paper providing analysis of a case and showing understanding of relevant concepts (from the list above). Assigned: 27 August 2009.
Due: 10 September 2009.

2. **An interview** with an engineer conducted **in the workplace**
to discuss an ethics case/problem from the course. The aim in the interview is to learn about resources in the workplace for dealing with such a problem. This assignment includes writing: 1) the interview questions and 2) an account of the interview (in the form of a dialogue) that concludes with a paragraph explaining insight gained from the interview about dealing with ethical problems in the workplace.
Assigned: 10 September 2009 Due: 08 October 2009.

3. Group Projects: Student groups of 3 or 4 students will be formed by mid- October 2009.

1) Each group will follow up a case in the text that concerns an actual situation, occurrence, or episode **or** another situation or episode that the group chooses. (See sample list below.)
2) From their research, the members of the group should obtain additional background and details so that they can address the ethical issue(s) raised by the case.
3) The group should produce an analysis of the issues they selected and use their analysis as a basis for conclusions and **recommendations for the future** that address those issues.
4) The group will make a presentation of 20 minutes during one of the last 4 classes and will also submit a hard copy of the presentation, **with citations of all sources used, including sources from the Interne**t. Projects will be graded either High Pass, Pass, or Fail (with each participant in the group getting the same grade on the presentation and on the hard copy of the group report).
5) **In addition**, on November 10, each student will submit paper #3, explaining the relevance of additional information brought forth in the group's research and providing a **preview of** the student's own position on the ethical issues. The preview must include supporting reasons and answers to envisaged objections.
6) The fourth and **final individual paper** must be submitted by the last class on December 3. It will be an **update** of the third paper, taking advantage of what was learned subsequently and providing "all things considered"

conclusions and **recommendations** based on evaluation of the preview offered in paper #3.

7) The final paper must.include **citations of all sources used, including online sources.** The paper will, of course, receive an individual grade.

Tests

There will be a mid-term during the entire class period on 13 October 2009 covering all assigned readings and topics scheduled to be completed before that date. There will be a two-hour final in exam week that will cover the entire course, with emphasis on topics and readings covered after the mid-term. Both tests will be chiefly essay tests.

Grading:

Assigned papers, reports, presentations, mid-terms, and finals will be graded on the quality of analysis and evidence of familiarity with material in the readings and class discussion. They will be graded on the writing (organization, grammar, and punctuation) as well.
In some cases, students may be given the option to revise and resubmit a paper.
If the revised paper is **substantially improved,** the paper will receive a higher grade that replaces the original grade.
Weighting: The first two assignments, the mid-term, and paper #3 will be equal in value. The group report, final paper, and final exam are weighted more heavily. A strong finish can retrieve a slow start; a weak finish can be costly after a good start.

Attendance and Punctuality:

It is very important to attend each class and to arrive on time. Learning in an ethics course requires involvement in classroom give and take. Students sign an attendance sheet at the start of every class.

Office Hours: Mondays and Wednesdays: 11: am – 1 pm, Tuesdays: 2 pm – 4 pm, Fridays: Noon - 2:00 pm, and at other times by appointment. Hermann Hall, 204.
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Some Options for Group Projects

Big Dig
City Corp Building/William LeMessurier
Green Power
Hyatt Regency Walkways
Hydrolevel
Love Canal
Service Learning Opportunities, p. 279
Shuttle Challenger Disaster
Shuttle Columbia Disaster

Class Schedule

Week 1 August 25, Topic: Ethics in Engineering: An Engineer Confronts an Ethics Problem
Course Introduction
Case: "Hot Metals in the Workplace," **Handout**
Class discussion and written response

August 27, Topic: Responsibility and Reasonable Care
Reading: "Responsibility in Engineering," pp. 22-34.
Case: Pulverizer, p. 268.
FIRST PAPER ASSIGNED

Week 2 ***September 1, Topic: Short History of Engineering***
Reading: Chapter 2 from *Thinking Like an Engineer* **in Blackboard**
Case: Hyatt Regency Walkway Disaster, p. 252.

September 3, Topic: The Engineering Profession
Reading: "Why Professional Ethics?" pp.1-8, Standards, pp. 34-36.
Case: XYZ Hose Co., p. 285.

Week 3 September 8, Topic: Understanding Language and Landscape of Morality and Ethics
Reading: "Three Types of Ethics or Morality," pp. 8-21.
Case: Training Firefighters, p. 280-81.

September 10, Topic: Ethics in the Workplace
"The Problem of Many Hands", "Impediments to Responsible Action," pp. 36-44.
Case: **"**Failure" (from 3rd edition) **in Blackboard**
FIRST ASSIGNMENT DUE
SECOND ASSIGNMENT PRESENTED

Week 4 ***September 15, Topic: Concepts and General Principles to Apply***
Reading: "Concepts and General Principles: Utilitarian Thinking," pp. 54-63.
Case: Ford Pinto, pp. 129-131, 266-267.

September 17, Topic: Concepts and General Principles to Apply (continued)
Reading: "Respect for Persons," pp. 64-70, Virtues, p. 24.
Case: Highway Safety Improvements, pp. 249-250.
Tracking Progress on Second Assignment

Week 5 September 22, Topic: Engineering Codes of Ethics: Voluntary, Yet Binding?
Reading: M. Davis, "Thinking Like an Engineer," CSEP Website: http://ethics.iit.edu
Case: Citicorp, pp. 238-239.

September 24, Topic: Engineers and Managers: Their Perspectives
Reading: "Engineers in Organizations," pp. 165-176.
V. Weil, "Is Engineering Ethics Just Business Ethics?" **in Blackboard**
Case: Gilbane Gold, p. 246.

Week 6 September 29, Topic: Loyalty and Disobedience
Reading: "Responsible Organizational Disobedience," pp. 171, 176-190.
Case: Resigning from a Project, pp. 269-270.

Tracking Progress on Second Assignment

October 1, Topic: Trustworthiness: How Honesty Matters
Reading: "Trust and Reliability," pp. 115- 122.
Case: John and Paul, pp. 115-116.

Week 7 October 6: Topic: Handling Information
Reading: "Confidentiality; Intellectual Property," pp. 122-128.
Cases: Engineer A and James, pp. 123-124; Bill of Roadrubber, then Slippery Tire, p. 125; Betty of Roadrubber, p. 126; Tom of Ford and GM, pp. 127-128.

October 8, Topic: Handling Information (continued)
Reading: "Expert Witnessing; Informing the Public," pp. 128-131, V. Weil, "Introduction to *Trying Times*," **in Blackboard**
Cases: The Applegate Memo; the Ford Pinto, pp. 129-131, 266-267.
SECOND ASSIGNMENT DUE

Week 8 October 13, MID-TERM Test

October 15, Topic: Conflicts Of Interest and What To Do About Them
Reading: "Conflicts of Interest," pp.131-134.
Cases: 1) The Hydrolevel Case, pp. 253-255; 2) Engineer Robin Sax, at Loramity, Inc, notices that a relatively new composite material that she specifies with increasing frequency has been especially well received. As she records an unusual number of favorable reports about the material from customers, she begins to think that she might benefit from buying stock in the company that manufactures the material.

Week 9 October 20, Topic: Bribery, Extortion, Grease, and Gifts
Reading: "Paying for Special Treatment: The Problem of Bribery," pp. 219- 224.
Case: "Catching Up With a Lucky Star," **in Blackboard**

October 22, Topic: Perspectives on Risk: Compare Experts with Laypersons
Reading: "Risk and Liability in Engineering," pp.135-145.
Case: The Space Shuttle Columbia, pp. 38-39.
Progress Report on Group Project (from each student)

Week 10 October 27, Topic: Perspectives on Risk: Compare Gov't Regulators with Scientists
Reading: "The Government Regulator's Approach to Risk," pp. 145-150.
Case: Cadillac Chips, p. 237.

October 29, Topic: Fault Trees, Event Trees; Normal Accidents and Normalized Deviance
Reading: "Difficulties in Determining the Causes and Likelihood of Harm," pp. 150-164.
Case: The Space Shuttle Challenger, pp. 155-156.

Week 11 November 3, Topic: Respect for the Environment
Reading: "Engineers and the Environment," pp. 191-199.
Case: Greenhouse Gas Emissions, pp. 247-248.

November 5, Topic: Debate about The Progressive Attitude toward the Environment
Reading: "The Progressive Attitude toward the Environment," pp.199-206.
Case: Green Power, pp. 246-247.

Week 12 November 10, Topic: Engineers' Obligations to the Environment: Sustainability
Reading: "Should Engineers Have Environmental Obligations?" pp. 206-210.
Case: Provisions in Engineering Codes (Students bring in provisions for critiquing)
PAPER #3 DUE

November 12, Topic: Aspirational Ethics
Reading: "The Positive Face of Engineering Ethics: Aspirational Ethics," pp. 14-18, 24, 238-239, 265-266, 271-272.
Cases: Halting a Dangerous Project, pp. 248-249; Hurricane Katrina, pp. 250-252.

Week 13 November 17, Topic: Good Works
Reading: "Good Works," pp. 15-18, 278-280.
Case: Disaster Relief, pp. 239-242.

November 19, Topic: Engineering Ethics across the Globe
Reading: "Ethical Resources for Solving Boundary-Crossing Problems," pp. 213-218.
Case: Laura's Plant, p. 214.
GROUP PROJECT PRESENTATIONS and CRITIQUING

Week 14 November 24, Topic: Engineering Ethics across the Globe (continued)
Reading: "Economic Underdevelopment: The Problem of Exploitation," pp. 218-219.
Case: Harwell & James, p. 212, Coppergiant, p. 218.
GROUP PROJECT PRESENTATIONS and CRITIQUING

November 26: Thanksgiving Holiday

Week 15 December 1, Topic: Engineers Reach Out for Good Works
Reading: Case 35: Service Learning, pp. 273-276.
Case: Engineers Without Borders, p. 276
GROUP PROJECT PRESENTATIONS and CRITIQUING

December 3, Topic: Course Wrap-up
GROUP PROJECT PRESENTATIONS and CRITIQUING COMPLETED

Week 16 FINAL EXAM
Goodbye